

List of Free-living and Plant-parasitic Nematodes Recognized from Egypt hitherto

By

M. M. ABOU-EL-NAGA*

Abstract. 120 species and 2 subspecies belonging to 31 families and 56 genera of free-living and plant-parasitic Nematoda are listed in the present work. These species represent the nematode fauna recorded till now from Egypt. The most abundant genera in order of frequency of occurrence were *Tylenchorhynchus*, *Pratylenchus*, *Meloidogyne*, *Helicotylenchus*, *Hoplolaimus*, *Xiphinema*, *Rhabditis* and *Cephalobus*.

Research work has been conducted for demonstrating the numbers, types and characteristics of nematodes living free and as plant parasitic in Egypt.

Between 1955 and 1962 OTEIFA et al. called attention to the circumstance that in cultivated fields and plots a wide range of known plant-parasitic Nematoda were to be found, such as *Meloidogyne* sp., *Tylenchorhynchus* sp., *Xiphinema* sp., and *Rhabditis* sp., as well as a great number of forms living free such as *Acrobeles* sp., *Cephalobus* sp. and *Dorylaimus* sp.

In 1962 the same author registered 10 species belonging to the genus *Pratylenchus* which accompanied the economic crops in Egypt.

In addition, OTEIFA (1964) drew up a taxonomic key of the common nematodes accompanying field crops, and described the stand of plant-parasitic nematodes in Egypt. His list includes more than 52 species which accompany economic plants.

TARJAN (1964) described new species belonging to the family Hoplolaimidae, and also listed 38 species of plant-parasitic nematodes in the same year.

Conducting research work on some freshwater samples ANDRÁSSY (1958) registered 14 species as new for the Egyptian fauna. Three of these were to be considered new for science, too.

ELMILIGY (1970) found two new species belonging to the family Hoplolaimidae, SHAFIE et al. (1970) could similarly record one new species of the family.

In his M. Sc. thesis MANSOUR (1972) registered 24 species, out of which 20 were new to the Egyptian fauna.

*Dr. Mohamed M. Abou-El-Naga, ELTE Állattudományi és Ökológiai Tanszék (Zoosystematical and Ecological Institute of the Eötvös Loránd University), 1088 Budapest, VIII. Puskin u. 3.

The present study is intended for a basis of elucidating the present stand of the nematode fauna of Egypt. In order of frequency, the richest genera are as follows: *Monhystera*, *Tylenchorhynchus*, *Helicotylenchus*, *Hoplolaimus*, *Pratylenchus*, *Mylonchulus*, *Mesodorylaimus*, *Longidorus* and *Xiphinema*.

The nematode species were ranked among the nomenclature and identified according to ANDRÁSSY's (1976) system.

120 species and two subspecies of nematodes representing 31 families are listed. The numbers in *italics* after the names of nematodes refer to the literature (see References).

Fam. Monhysteridae

1. *Monhystera elegantula* SCH. STEKHOVEN, 1935—3
2. *M. filiformis* BASTIAN, 1865—21
3. *M. macramphis* FILIPJEV, 1930—3
4. *M. parva* BASTIAN, 1865—3
5. *Theristus borosi* ANDRÁSSY, 1958—3

Fam. Diplolaimellodidae

6. *Diplolaimelloides delyi* ANDRÁSSY, 1958—3

Fam. Cylindrolaimidae

7. *Cylindrolaimus communis* DE MAN, 1880—21

Fam. Plectidae

8. *Plectus sambesii* MICOLETZKY, 1915—3

Fam. Chromadoridae

9. *Chromadora germanica* BÜTSCHLI, 1874—3

Fam. Cephalobidae

10. *Cephalobus persegnis* BASTIAN, 1865—2
11. *Heterocephalobus buchneri* (MEYL, 1953) ANDRÁSSY, 1967—21
12. *H. elongatus* (DE MAN, 1880) ANDRÁSSY, 1967—32
13. *H. teres* (THORNE, 1937) ANDRÁSSY, 1967—21

Fam. Panagrolaimidae

14. *Panagrolaimus wichmanni* RÜHM, 1956—2
15. *Panagrellus dorsobidentatus* (RÜHM, 1956) BAKER, 1962—21

Fam. Rhabditidae

16. *Mesorhabditis spiculigera* (STEINER, 1936) DOUGHERTY, 1953—3
17. *M. ultima* (KÖRNER in OSCHKE, 1952) DOUGHERTY, 1955—21
18. *Rhabditis axei* (COBBOLD, 1884) DOUGHERTY, 1955—2
19. *Rhabditolaimus crassus* (KÖRNER, 1954) ANDRÁSSY, 1958—2

Fam. Aphelenchidae

20. **Aphelenchus avenae** BASTIAN, 1865 — 17, 28

Fam. Aphelenchoididae

21. **Aphelenchoides parietinus** BASTIAN, 1865 — 33

Fam. Anguinidae

22. **Anguina tritici** (STEINBUCH, 1799) CHITWOOD, 1935 — 17, 28
23. **Ditylenchus angustus** (BUTTLER, 1913) FILIPJEV, 1936 — 37
24. **Pseudhalenchus anchilospomus** TARJAN, 1958 — 44

Fam. Psilenchidae

25. **Basiria graminophila** SIDDIQI, 1959 — 44
26. **Psilenchus aestuarius** ANDRÁSSY, 1962 — 15, 44
27. **P. hilarulus** DE MAN, 21, 44

Fam. Neotylenchidae

28. **Boleodorus thylactus** THORNE, 1949 — 15

Fam. Tylenchorhynchidae

29. **Merlinius brevidens** (ALLEN, 1955) SIDDIQI, 1970 — 15
30. **M. nothus** (ALLEN, 1955) SIDDIQI, 1970 — 15
31. **Tylenchorhynchus brassicae** SIDDIQI, 1961 — 44
32. **T. capitatus** ALLEN, 1955 — 25
33. **T. clarus** ALLEN, 1955 — 12, 15, 35
34. **T. clavicauda** SEINHORST, 1968 — 36, 44
35. **T. cylindricus** COBB, 1913 — 36, 44
36. **T. dubius** (BÜTSCHLI, 1873) FILIPJEV, 1936 — 33
37. **T. goffarti** STURHAN, 1966 — 15
38. **T. kegenicus** LITVINOVA, 1946 — 44
39. **T. latus** ALLEN, 1955 — 35, 36, 44
40. **T. martini** FIELDING, 1936 — 25

Fam. Belonolaimidae

41. **Telotylenchus ventralis** LOOF, 1963 — 44

Fam. Hoplolaimidae

42. **Helicotylenchus agricola** ELMILIGY, 1970 — 14
43. **H. cavenessi** SHER, 1966 — 13
44. **H. digonicus** PERRY, 1959 — 33, 36
45. **H. dihystra** (COBB, 1893) SHER, 1961 — 13, 33, 36
46. **H. egyptiensis** TARJAN, 1964 — 43, 44
47. **H. erythrinae** (ZIMMERMANN, 1904) GOLDEN, 1956 — 25
48. **H. mangiferensis** ELMILIGY, 1970 — 14
49. **H. microlobus** PERRY, 1959 — 44
50. **H. multicinctus** (COBB, 1893) GOLDEN, 1956 — 13, 44

51. *Hirschmanniella gracilis* (DE MAN, 1880) LUC & GOODEY, 1964—25
52. *H. oryzae* (BREDÁ DE HAAN, 1902) LUC & GOODEY, 1964—44
53. *Hoplolaimus aegypti* SHAFIE & KOURA, 1970—38
54. *H. columbus* SHER, 1963—35, 36, 39
55. *H. galeatus* COBB, 1913—33, 36
56. *H. pararobustus* (SCH. STEKHOVEN & TEUNISSEN, 1938) SHER, 1963—13
57. *H. tylenchiformis* DADAY, 1905—25
58. *Radopholus similis* (COBB, 1893) THORNE, 1949—23, 44
59. *Rotylenchoides variocaudatus* LUC, 1960—33
60. *Rotylenchulus reniformis* LINFORD & OLIVEIRA, 1940—24, 30, 31
61. *Rotylenchus robustus* (DE MAN, 1876) FILIPJEV, 1936—36
62. *Scutellonema blaberum* (STEINER, 1937) ANDRÁSSY, 1958—21
63. *S. brachyurum* (STEINER, 1938) ANDRÁSSY, 1958—44

Fam. Pratylenchidae

64. *Pratylenchus brachyurus* (GODFREY, 1929) FILIPJEV & SCH. STEKHOVEN, 1941—24, 35
65. *P. coffeae* (ZIMMERMANN, 1898) FILIPJEV & SCH. STEKHOVEN, 1941—24
66. *P. crenatus* LOOF, 1960—35, 44
67. *P. goodeyi* SHER & ALLEN, 1953—24
68. *P. minyus* SHER & ALLEN, 1953—24
69. *P. musicola* (COBB, 1919) FILIPJEV, 1936—23
70. *P. neglectus* (RENCH, 1924) FILIPJEV & SCH. STEKHOVEN, 1941—35, 36
71. *P. penetrans* (COBB, 1917) FILIPJEV & SCH. STEKHOVEN, 1941—24, 35, 36
72. *P. pratensis* (DE MAN, 1880) FILIPJEV, 1936—24, 28
73. *P. scribneri* STEINER, 1943—24
74. *P. thornei* SHER & ALLEN, 1953—15, 24, 44
75. *P. vulnus* ALLEN & JENSEN, 1951—24, 35
76. *P. zcae* GRAHAM, 1951—35, 36

Fam. Heteroderidae

77. *Heterodera glyeines* ICHINOHE, 1952—15, 41
78. *Meloidogyne arenaria* (NEAL, 1889) CHITWOOD, 1949—10, 30
- 78a. *M. arenaria thamesi* CHITWOOD, 1949—10, 30
79. *M. hapla* CHITWOOD, 1949—25
80. *M. incognita* (KOFFOID & WHITE, 1919) CHITWOOD, 1949—10, 19, 23
- 80a. *M. incognita acrita* CHITWOOD, 1949—10, 32, 30
81. *M. javanica* (TREUB, 1885) CHITWOOD, 1949—7, 8, 11, 22

Fam. Criconematidae

82. *Hemicriconemoides mangiferae* SIDDIQI, 1961—15
83. *Hemicycliophora oostenbrinki* LUC, 1958—25
84. *H. similis* THORNE, 1955—25
85. *Nothocriconema mutabile* (TAYLOR, 1936) DE GRISSE & LOOF, 1965—44

Fam. Tylenchulidae

86. *Tylenchulus semipenetrans* COBB, 1913—32, 36, 44

Fam. Alaimidae

87. *Alaimus primitivus* DE MAN, 1880 — 2

Fam. Tripylidae

88. *Tobrilus gracilis* (BASTIAN, 1865) ANDRÁSSY, 1959 — 3

Fam. Mononchidae

89. *Prionchulus muscorum* (DUJARDIN, 1845) WU & HOEPLI, 1929 — 21

Fam. Mylonchulidae

90. *Mylonchulus brachyuris* (BÜTSCHLI, 1845) ALTHERR, 1954 — 21
91. *M. brevicaudatus* (COBB, 1917) ALTHERR, 1954 — 21
92. *M. cavensis* (SCHNEIDER, 1940) ANDRÁSSY, 1958 — 21
93. *M. polonicus* (STEFANSKI, 1915) ANDRÁSSY, 1958 — 3
94. *M. signaturus* (COBB, 1917) ALTHERR, 1953 — 22

Fam. Anatonchidae

95. *Anatonchus kreisi* MEYL, 1961 — 35

Fam. Dorylaimidae

96. *Dorylaimus steinerianus* JOHNSTON, 1938 — 21
97. *Mesodorylaimus aegypticus* (ANDRÁSSY, 1958) ANDRÁSSY, 1959 — 3
98. *M. centrocercus* (DE MAN, 1880) GERAERT, 1966 — 21
99. *M. deuberti* (ANDRÁSSY, 1958) GOODEY, 1963 — 12
100. *M. intervallis* (THORNE & SWANGER, 1936) ANDRÁSSY, 1959 — 3
101. *Paradorylaimus filiformis* (BASTIAN, 1865) ANDRÁSSY, 1959 — 3

Fam. Qudsianematidae

102. *Discolaimoides bulbiferus* (COBB, 1906) HEYNS, 1963 — 6
103. *Eudorylaimus gracilis* (DE MAN, 1876) GOODEY, 1963 — 21
104. *E. rhopalocercus* (DE MAN, 1876) ANDRÁSSY, 1959 — 21
105. *E. subacutus* (ALTHERR, 1952) ANDRÁSSY, 1959 — 21
106. *Labronema estonicum* KRALL, 1957 — 21

Fam. Aporcelaimidae

107. *Aporcelaimus obscurus* (THORNE & SWANGER, 1936) HEYNS, 1966 — 28

Fam. Nordiidae

108. *Pungentus silvestris* (DE MAN, 1912) COOMANS & GERAERT, 1962 — 21

Fam. Longidoridae

109. *Longidorus africanus* MERNY, 1966 — 1
110. *Longidorus elongatus* (DE MAN, 1876) THORNE & SWANGER, 1936 — 32, 33, 35
111. *L. laevicapitatus* WILLIAMS, 1959 — 36, 44
112. *L. taniwha* CLARK, 1963 — 36, 44

113. *Paralongidorus georgiensis* (TULAGANOV, 1937) SIDDIQI, 1965 — 1, 36, 44
114. *Xiphinema americanum* COBB, 1913 — 28, 35, 45
115. *X. arenarium* LUC & DALMASSO, 1964 — 36, 44
116. *X. elongatum* SCH. STEKHOVEN & TEUNISSEN, 1938 — 36, 44
117. *X. insigne* LOOS, 1949 — 36, 44

Fam. Trichodoridae

118. *Trichodorus christiei* ALLEN, 1957 — 25
119. *T. minor* COLBRAN, 1956 — 36, 44
120. *T. teres* HOOPER, 1962 — 35, 36, 44

Acknowledgement

The author wishes to express his deep gratitude to Prof. I. ANDRÁSSY for his encouragement, helpful criticism, and kindness of reviewing the manuscript.

REFERENCES

1. ABOUL-EID, H. Z. (1970): *Systematic notes on Longidorus and Paralongidorus*. — *Nematologica*, 16: 159 — 179.
2. ALI, M., WAHAB, A. & EL-KIFEL, A. H. (1972): *Nematodes associated with Coleoptera species in Egypt*. — *J. Parasitol. Hung.*, 5: 177 — 201.
3. ANDRÁSSY, I. (1958): *Ergebnisse der zoologischen Aufsammlungen des Ungarischen Naturwissenschaftlichen Museums in Ägypten im Jahre 1957. 2. Nematoden aus ägyptischen Gewässern*. — *Ann. — Hist. nat. Hung.*, 50: 135 — 150.
4. ANDRÁSSY, I. (1976): *Evolution as a basis for the systematization of nematodes*. — *Akadémiai Kiadó, Budapest*, 1 — 286.
5. COOMANS, A. & LOOF, P. A. (1970): *Morphology and taxonomy of Bathyodontina*. — *Nematologica*, 16: 180 — 196.
6. DAS, V. M., KHAN, E. & LOOF, P. A. A. (1969): *Revision of the genus Discolaimoides Heyns, 1963, with description of two new species reminiscent of this genus*. — *Nematologica*, 15: 473 — 491
7. ELGINDI, D. M. (1967): *Influence of pH on hatching and larval emergence of root-knot nematode Meloidogyne javanica*. — *Bull. Fac. Agric. Cairo, Univ.*, 18: 137 — 142.
8. ELGINDI, D. M. (1967): *Evaluation of some sugar-containing amendment of the survival of Meloidogyne larvae*. — *Bull. Fac. Agric. Cairo, Univ.*, 18: 119 — 122.
9. ELGINDI, D. M. & OTEIFA, B. A. (1967): *Preliminary studies on the control of the cotton nematode Tylenchorhynchus latus by D-D, and DBCP nematicides*. — *Bull. Fac. Agric. Cairo, Univ.*, 18: 129 — 135.
10. ELGINDI, D. M. & MOUSSA, F. F. (1971): *Root-knot nematodes in recently reclaimed sandy areas of U. A. R. II. New host records for root-knot nematodes, Meloidogyne spp.* — *Meded. Fac. Landbouw. Rijksuniv. Gent*, 36: 1341 — 1344.
11. EL-HELALY, A. F., ABO-EL-DAHAB, M., MICHAEL, S. H. & MEHAR, F. A. (1968): *Fusarium solani, the cause of a type of damping-off of cotton seedlings in Egypt, with special reference to the role of Meloidogyne javanica on the severity of the disease*. — *Compt. Rend. Sec. Journ. Phyt. Phytopharm. Circum-Méditerr., Nice*: 180 — 186.
12. ELMILIGY, I. A. (1969): *Redescription of Tylenchorhynchus clarus Allen, 1955*. — *Nematologica*, 15: 288 — 290.
13. ELMILIGY, I. A. (1970): *On some Hoplolaiminae from Congo and Egypt*. — *Meded. Fac. Landbouw. Rijksuniv. Gent*, 35: 1141 — 1153.

14. ELMILIGY, I. A. (1970): *Three new species of the genus Helicotylenchus Steiner, 1945 (Hoplolaiminae: Nematoda)*. — Meded. Fac. Landbouw. Rijksuniv. Gent, 35: 1099—1106.
15. ELMILIGY, I. A. & GERAERT, E. (1971): *Occurrence of some plant-parasitic nematodes belonging to Tylenchida (Nematoda) in Egypt and Congo-Kinshasa*. — Biol. Jaarb., 39: 150—156.
16. EL-SHERIF, M. & EMBABI, M. (1975): *The reniform nematode on jasmine in Egypt*. — Plant Disease Rep., 59: 65.
17. GOFFART, H. (1951): *Nematoden der Kulturpflanzen Europas*. — Berlin: 1—144.
18. GOODEY, T. (1932): *The genus Anguillulina (Gerr. & v. Ben., 1859, vel Tylenchus Bastian, 1865)*. — Journ. Helminthol., 10: 75—180.
19. IBRAHIM, I. K. A., IBRAHIM, I. A. & MASSOUD, S. I. (1972): *Induction of galling and lateral roots on five varieties of soybeans by Meloidogyne javanica and M. incognita*. — Plant Disease Rep., 56: 882—884.
20. KHADR, A. S., SALEM, A. A. & OTEIFA, B. A. (1972): *Varietal susceptibility and significance of the reniform nematode Rotylenchulus reniformis in Fusarium wilt of cotton*. Plant Disease Rep., 56: 1040—1042.
21. MANSOUR, I. M. (1972): *Magnitude and distribution of soil nematodes in a newly-reclaimed area (Nasr City)*. — M. Sc. Thesis Al-Azhar Univ. Cairo, Egypt. 1—72.
22. MOH, A. S., NASSER, S. H. & ATTILA, M. S. (1972): *Gawaher (Giza 1) a tomato variety with resistance to the root-knot nematodes*. — Agric. Res. Arab Rep. Egypt, 50: 39—45.
23. OTEIFA, B. A. (1957): *Nematode root rot of banana*. — Bull. Fac. Agric. Cairo, Univ., 143: 1—11.
24. OTEIFA, B. A. (1962): *Species of root-lesion nematodes commonly associated with economic crops in the delta of U. A. R.* — Plans Disease Rep., 46: 572—575.
25. OTEIFA, B. A. (1964): *A taxonomic guide to the common genera of soil and plant nematodes with a supplement on current known economic parasitic species of U. A. R.* — Cont. Nat. centre, 1—32.
26. OTEIFA, B. A. (1970): *The reniform nematode problem of Egyptian cotton production*. — Journ. Parasit., 56: 255.
27. OTEIFA, B. A. (1970): *Systemic pesticides against the cotton reniform in Egypt Intern.* — Congr. Plant Prot. Paris. 192—193.
28. OTEIFA, B. A. & ABDEL HALIM, M. F. (1958): *Cropping effect on population dynamics of soil nematodes*. — Bull. Fac. Agric. Cairo, Univ., 128: 1—12.
29. OTEIFA, B. A. & ELGINDI, D. M. (1967): *The nematocidal efficiency of slaked lime $Ca(OH)_2$ in the control of root-knot nematodes of dahlias*. — Bull. Fac. Agric. Cairo, Univ., 18: 123—128.
30. OTEIFA, B. A., ELGINDI, D. M. & MOUSSA, F. F. (1970): *Root-knot problem in recently reclaimed sandy areas of U. A. R. 1. Nematode infestation and host range*. — Meded. Fac. Landbouw. Rijksuniv. Gent, 35: 1167—1176.
31. OTEIFA, B. A., GIBRAIL, M. A. & SEDKY, E. (1970): *Effect of certain carbamated and phosphated pesticides on the soil population density of the Rotylenchulus reniformis of cotton Gossypium barbadense*. — Agric. Res. Review, Cairo, 48: 129—131.
32. OTEIFA, B. A. & RAGAB, M. A. (1957): *Soil nematodes and fungi associated with cotton roots*. — Bull. Agric. Fac. Cairo, Univ., 142: 1—6.
33. OTEIFA, B. A., RUSHDI, M. & EL-SHARAAWI, S. (1964): *A preliminary survey on nematodes associated with cotton fields of Assiut Province with special reference to distribution of parasitic genera*. — Bull. Science and Tech., 7: 205—218.
34. OTEIFA, B. A. & SHARKAWI, A. T. (1972): *Observation on the citrus nematode Tylenchulus semipenetrans Cobb, in U. A. R.* — Nematologica, 8: 267—271.
35. OTEIFA, B. A. & TAHA, A. (1964): *Significance of plant parasitic nematodes in maize deterioration problem*. — Egyptian Agric. Organ. Bah. Exp. Tech. Bull. 73: 1—16.

36. OTEIFA, B. A. & TARJAN, A. C. (1965): *Potentially important plant-parasitic nematodes present, in established orchards of newly-reclaimed sandy areas of the U. A. R.* — Plant Disease, reporter, 49: 596—597.
37. SASSER, J. N. & JANKNIS, W. R. (1960): *Nematology*. — Chapel Hill, N. C., spec. p. 368—369.
38. SHAFIE, M. F. & KOURA, F. (1970): *Hoplolaimus aegypti* n. sp. (Hoplolaimidae: Tylenchida) from U. A. R. — Bull. Zool. Soc. Egypt, 22: 117—120.
39. SHAFIE, M. F. & OSMAN, A. (1971): *The use of nematocides and acaricides for the control of nematodes and mites in established mango orchards*. — Phytopathol. Mediterr., 10: 271—273.
40. SHAFIE, M. F., KOURA, F. & OTEIFA, B. A. (1974): *Comparative population dynamics of Pratylenchus zeae and Hoplolaimus aegypti on maize (Zea mays)*. — Ann. Agric. Sci. Mosh., 1: 235—242.
41. STELTER, H. (1973): *Die Arten der Gattung Heterodera (Nematoda: Tylenchidae) und ihre Verbreitung*. — Pedobiologia, 13: 40—61.
42. STEINER, G. (1931): *On the status of the nemic genera Aphelenchus Bastian, Pathoaphelenchus Cobb, Paraphelenchus Micoletzky, Parasitaphelenchus Fuchs, Isonchus Cobb and Seinura Fuchs*. — Journ. Wash. Acad. Sci., 21: 468—475.
43. TARJAN, A. C. (1964): *Two new macronate-tailed spiral nematodes (Helicotylenchus: Hoplolaiminae)*. — Nematologica, 10: 185—191.
44. TARJAN, A. C. (1964): *Plant parasitic nematodes in the U. A. R.* — FAO Plant Prot., 12: 1—8.
45. TARJAN, A. C. (1969): *Variation within the Xiphinema americanum group (Nematoda: Longidoridae)*. — Nematologica, 15: 241—252.